

Claims

[c1] 1. A method for forming a channel layer in a Thin Film Transistor (TFT), comprising:
providing a substrate;
forming a first a-Si layer on the substrate by using a Chemical Vapor Deposition (CVD) method, wherein the first a-Si layer is formed under a condition of a flux ratio of H_2/SiH_4 being within a range from 0.40 to 1.00; and
forming a second a-Si layer on the first a-Si layer by using the CVD method.

[c2] 2. The method of claim 1, wherein the second a-Si layer is formed under a condition of the flux ratio of H_2/SiH_4 being within a range from 0.95 to 1.00.

[c3] 3. The method of claim 1, wherein a plurality of manufacture process conditions to form the first a-Si layer comprise:
a flux of SiH_4 is from 1000 to 4600 sccm;
a flux of H_2 is from 400 to 4600 sccm;
an operating pressure is from 0.75 to 1.00 mbar; and
a radio frequency (RF) power is from 70 to 100 W.

[c4] 4. The method of claim 1, wherein the manufacture pro-

cess conditions to form the second a-Si layer comprise:
the flux of SiH₄ is from 1000 to 5700 sccm;
the flux of H₂ is from 950 to 5700 sccm;
the operating pressure is from 1.3 to 1.6 mbar; and
the radio frequency (RF) power is from 200 to 320 W.

- [c5] 5. The method of claim 1, wherein a thickness of the first a-Si layer is from 100 to 500 angstroms.
- [c6] 6. The method of claim 1, wherein a thickness of the second a-Si layer is from 1000 to 2000 angstroms.
- [c7] 7. The method of claim 1, wherein a deposition rate of the first a-Si layer is smaller than the deposition rate of the second a-Si layer.
- [c8] 8. The method of claim 1, wherein the first a-Si layer is thinner than the second a-Si layer.
- [c9] 9. A method of improves the photo leakage current problem of a Thin Film Transistor (TFT), the Thin Film Transistor having a channel layer including a first a-Si layer on a substrate and a second a-Si layer on the first a-Si layer, characterized in that:
making the first a-Si layer having more defects than an a-Si layer formed by CVD method under a condition of a flux ratio of H₂/SiH₄ being 5.0.

- [c10] 10. The method of claim 9, wherein the first a-Si layer is formed by using a Chemical Vapor Deposition (CVD) method under a condition of a flux ratio of H_2/SiH_4 being within a range from 0.40 to 1.00.
- [c11] 11. The method of claim 10, wherein a plurality of manufacture process conditions to form the first a-Si layer comprise:
 - a flux of SiH_4 is from 1000 to 4600 sccm;
 - a flux of H_2 is from 400 to 4600 sccm;
 - an operating pressure is from 0.75 to 1.00 mbar; and
 - a radio frequency (RF) power is from 70 to 100 W.
- [c12] 12. The method of claim 10, wherein the first a-Si layer is formed by using a Chemical Vapor Deposition (CVD) method under a condition of a flux ratio of H_2/SiH_4 being within a range from 0.95 to 1.00.
- [c13] 13. The method of claim 12, wherein the manufacture process conditions to form the second a-Si layer comprise:
 - the flux of SiH_4 is from 1000 to 5700 sccm;
 - the flux of H_2 is from 950 to 5700 sccm;
 - the operating pressure is from 1.3 to 1.6 mbar; and
 - the radio frequency (RF) power is from 200 to 320 W.
- [c14] 14. The method of claim 12, wherein a deposition rate of

the first a-Si layer is smaller than the deposition rate of the second a-Si layer.

- [c15] 15. The method of claim 9, wherein the first a-Si layer is thinner than the second a-Si layer.
- [c16] 16. The method of claim 9, wherein a thickness of the first a-Si layer is from 100 to 500 angstroms.
- [c17] 17. The method of claim 16, wherein a thickness of the second a-Si layer is from 1000 to 2000 angstroms.